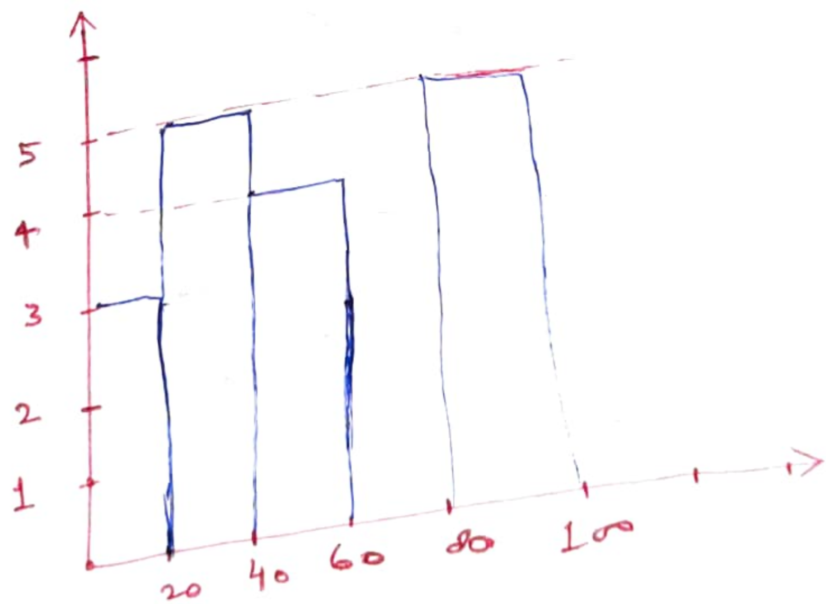
Que 1) Plot a histogram.

10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88
90, 92, 94, 99

class Interval	Frequency
0 - 20	3
20 - 40	5
40 - 60	4
60 - 80	0
80 - 100	5



Que 2) In a quant test of the CAT Exam, the population standard deviation is known to be 100. A sample of 25 tests taken has a mean of 520. construct an 80% CI about the mean.

CI	z
80%	1.282 ✓
85	1.440
⋮	⋮

$s = 100$

$n = 25$

$\bar{x} = 520$

For 80% $z = 1.282$

Formula $\bar{x} \pm z \frac{s}{\sqrt{n}}$

$520 \pm \left(1.282 \times \frac{100}{\sqrt{25}}\right)$

$= 520 \pm (1.282 \times 20)$

$= 520 \pm 25.6$

$= (494 \text{ to } 546)$

520 (80% CI 494 to 546)

Margin of Error : 25.6 (25.64)

Que 3) A Car believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A Sales manager disagrees with this. He conducted a Hypothesis testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle

a) state the null & alternate hypothesis

b) At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

Ans → ⓐ Null hypothesis : The percentage of citizens in city ABC who own a vehicle is equal to or greater than 60%.

Alternate hypothesis : The percentage of citizens in city ABC who own a vehicle is less than 60%.

ⓑ To determine if there is enough evidence to support the idea that vehicle ownership in ABC city is 60% or less, we will use one-tailed hypothesis test with a 10% significance level.

The test statistic can be calculated as follows:

$$Z = (x - \mu) / (\sigma / \sqrt{n})$$

where

x = number of residents who own a vehicle = 170

μ = hypothesized proportion of residents who own a vehicle = 0.6

σ = standard deviation of the proportion = ~~[illegible]~~

$= \sqrt{\mu(1-\mu)}$

n = sample size = 250

Plugging in the values, we get:

$$z = (170/250 - 0.6) / \sqrt{(0.6 \times 0.4/250)} = -1.96$$

The critical value of z for a one-tailed test with a 10% significance level is (-1.28). We reject the null hypothesis and accept the alternate hypothesis. Therefore, there is enough evidence to support the idea that vehicle ownership in ABC city is less than 60%.

Que 4) What is the value of the 99 percentile?

2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 11, 11, 12

n = 20 (no. of data points)

$$\text{rank} = \frac{99}{100} \times n = 0.99 \times 20 = 19.8$$

19th value = 11

20th value = 12

99th percentile = (value at rank-1) + (rank - (rank-1)) $\times$ (value at rank - (value at rank-1))

$$99^{th}\text{ percentile} = 11 + (19.8 - 19) \times (12 - 11) = 11 + 0.8 \times 1$$

$$= 11.8$$

Ans

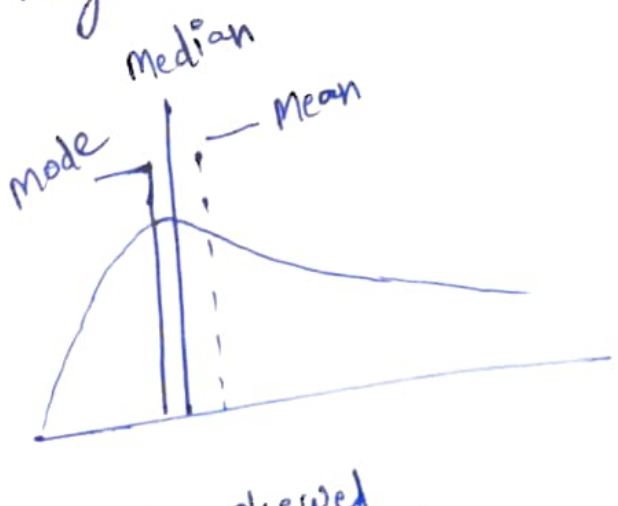
Therefore, the 99th percentile of the given data is 11.8

Que 5) In left & right-skewed data, what is the relationship between mean, median & mode? Draw the graph to represent the same.

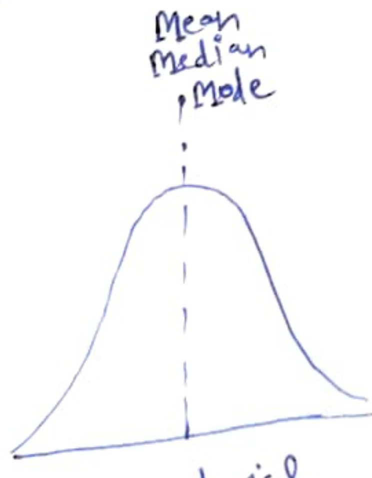
Answer =>

Left skewed data :- In the left-skewed data, the mean is less than the median, which is less than the mode. This means that there are more observations on the right side of the distribution, resulting in a longer tail on the left side.

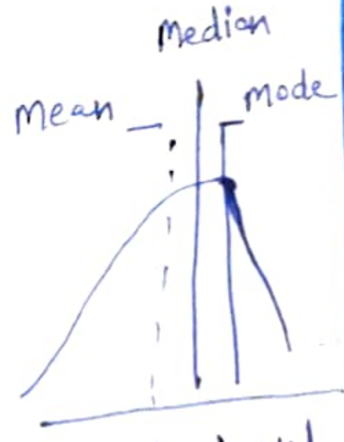
Right skewed data :- In the right-skewed data the mode is less than the median which is less than the mean. This means that there are more observations on the left side of the distribution, resulting in a longer tail on the right side.



Right skewed



Symmetrical Distribution



Left skewed